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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(21) International Application Number: PCT/US97/12001 (22) International Filing Date: 10 July 1997 (10.07.97) (30) Priority Data: 60/021,644 12 July 1996 (12.07.96) US (71) Applicant (for all designated States except US): INTERACTIVE PICTURES CORPORATION [US/US]; Suite 100, 1009 Commerce Park, Oak Ridge, TN 37830 (US). (71)(72) Applicants and Inventors: MARTIN, H., Lee [US/US]; 11615 South Monticello Drive, Knoxville, TN 37760 (US). GRANTHAM, H., Craig [US/US]; 717 East Broadway, Jefferson City, TN 37760 (US). (74) Agents: POTENZA, Joseph, M. et al.; Banner & Witcoff, Ltd., Suite 1100, 1001 G Street, N.W., Washington, DC 20001 (US).		(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG). Published With international search report.	
		<i>H = Pas de possibilité de mise à jour</i> <i>Elle ne stocke que certaines données en fonction du client, afin que les clients ne puissent pas accéder à la totalité des données.</i>	
(54) Title: VIEWER PROFILE OF BROADCAST DATA AND BROWSER <i>donc le stockage moderne</i>			
(57) Abstract			
<p>A method and apparatus for broadcast information distribution of digital data and images with selective capture and interaction with those images without any need for bidirectional communications. The apparatus receives a continuous transmission of data broadcast through common unidirectional methods typically associated with television (free space transmission, satellite transmission, cable transmission) (21, 22, 23), the information is collected based on criteria established by the viewer (8) and is then stored (5) for later interactive review (6, 7) by the viewer. The method and apparatus can be used in a system where massive amounts of interactive data are to be distributed, but the infrastructure of the communications network is such that bidirectional communications are not feasible. The collection of the information is done in a manner as to capture only the portion of information that is of interest to the viewer, based on his/her interests. In such a way, a data network with interactive images can provide comprehensive, interactive images for real estate, apartment, automobile, and employment listings.</p>			
<pre> graph LR 21[SERVER] --> 22[BROADCAST SYSTEM] subgraph 22 [BROADCAST SYSTEM] 23[Transmitter] --> 22 22[Receiver] --> 22 end 22 --> 3[DEMODULATOR] 3 --> 24[TV/PC] subgraph 24 [TV/PC] 7[DISPLAY] <--> 6[LOCAL BROWSER] 6 <--> 5[LOCAL STORAGE] 5 <--> 4[DATA FILTER] 4 <--> 8[VIEWER PROFILE] 8 <--> 9[VIEWER CONTROL] 9 <--> 6 end </pre>			

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VIEWER PROFILE OF BROADCAST DATA AND BROWSER

TECHNICAL FIELD

The invention relates to a method and apparatus for processing broadcast data streams
5 and, in particular, to a method and apparatus for allowing the selective capture of digital data
and then allowing interactivity with the captured data at the convenience of the viewer.

BACKGROUND OF THE INVENTION

The Internet has grown rapidly in availability and use in recent years. This growth has
resulted in a number of data transmission and distribution problems. Conventionally, the
10 communications infrastructure has been developed either for low-bandwidth, bidirectional
communications (telephone) or for high-bandwidth, unidirectional transmission (television).
Recently, this conventional infrastructure has been adapted to accommodate Internet and
Intranet communications requirements. As a result, systems have been constrained at the
distribution point due to server performance and capacity limitations, and at the destination
15 point due to modem reception rate limitations. Additionally, these systems may also be
constrained across "backbone" communication links as the bandwidth requirements for
satisfying the exploding Internet user base increase beyond the available infrastructure. It is
anticipated that these problem will be exasperated due to the advent of cable modems,
asynchronous transmission modems, and other devices.

Attempts at alleviating some of the above mentioned problems include the use of intelligent "agents" to provide for local data selection. Intelligent agents are programmed by a user to search the available sources of on-line information to identify data which meets a predetermined criteria and to present this data to the user. The agents move throughout a network collecting data and return data which has the best correlation to the selection criteria. However, although intelligent agents reduce the local response time for an individual user, the local agents increase the load on the network "backbone" structure.

In a similar, but more simplified approach, PointCast has developed an information network that allows the viewer to complete a profile on his/her interests, and each time the viewer attaches to the PointCast Internet site, the pertinent information of interest is sent to the viewer. The agent becomes a list of desired information that is sent by the server to the viewer whenever the viewer logs onto the system.

Outside of the Internet arena, Direct broadcast satellites use encrypted codes to allow only the target units to receive the transmission information.

Additionally, Intericast systems that broadcast digital data during the vertical blanking interval of the television signal also exist to provide services, such as closed-captioning and other information for viewers. The feasibility of broadcast of digital information in a region, nationally, or internationally is established, and the capture of such data with an appropriately equipped personal computer is also proven in the art of broadcast television.

Conventionally, the Internet and its supporting infrastructure have a number of limitations such as bandwidth constraints and server constraints. Since communications in the

Internet are point-to-point, every user must be connected to a host in a bidirectional manner that is uniquely responsive. This makes the network model look much like a switched circuit telephone system which limits the bandwidth in current configurations.

5 Additionally, servers are constrained by the need to respond to requests by individual users and the Internet backbone resources are taxed by continually active intelligent agents roaming the Internet. Accordingly, there is a need for rapid access to a selected portion of a wide array of information stored in centralized databases (e.g., the Internet or other Intranets), without the need for bidirectional communications.

SUMMARY OF THE INVENTION

10 Objects of the invention include providing an apparatus and a method for remedying the above problems by eliminating the need for communications back to the server from the local terminal device and the need for intelligent agents which continuously query the server.

One aspect of the present invention is a local terminal device such as a television or personal computer which accepts all information broadcast from the server but retains in local storage only the information of interest to the viewer. Once this information is captured, the viewer can interact with the information locally to browse the Internet (e.g., via hypertext or other html links) in the manner desired. By using broadcast means to distribute digital data, massive amounts of data can blanket the country from a single server and available infrastructure. The invention does not require bidirectional communications, so the resulting network can resemble a television broadcast providing data at a much higher rate.

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Additionally, the local terminal device can browse through the captured data much more efficiently without the bandwidth constraints and associated delay of present on-line information sources. Since most on-line information sources (such as the Internet and other on-line information sources) typically provide much more information than the user has an
5 interest in receiving, the present system allows the user to have highspeed and up-to-date access for information which is of interest.

The invention allows for the distribution of the processing burden from the server to each of the local terminals by utilizing a profile of the viewer's interest to filter broadcast data and thereby select the data that is to be captured and stored locally. Thus, the invention allows
10 for the economical availability of massive, up-to-date data possible on a wide scale to the general populace.

In accordance with the present invention, there is provided an information system that allows selective capture of broadcast digital information, based on the local desires of the viewer, without any need for communications back to the source. The invention includes a
15 means for receiving a broadcast digital stream of data, means for automatically capturing that data based on specific criteria set forth by the viewer, means for saving the captured data to a local storage media for later review, and means for navigating the captured data under the control of a viewer after the data that has been stored locally.

The content captured for the viewer is preferably a subset of the entire stream of data
20 that is received by the viewer's unit, based upon the current interests and needs of the viewer. More particularly, the viewer's unit captures all data of interest, as specified by the viewer,

without the need for a back channel communications link to the originating source of the data. In this manner, the processing load on the central server is minimized in the need for a return communications path is eliminated. The captured data can be interacted upon by the viewer as if he/she were on-line, but the interactivity is with data that has recently been captured to a local storage media, rather than to the on-line server. In this way, millions of viewer units can receive the same broadcast data stream (similar to television signal distribution), but can selectively interact with the information of their interests (similar to on-line Internet) from a region of storage on their local storage media (most preferably, a hard disk). Thereafter, a conventional browser may provide the navigation means to explore the captured data.

10 The result is personalized data extracted individually from a massive stream of data that is readily accessible without a change in the communications distribution infrastructure presently available. The invention has wide applicability, but may be particularly applicable for updating specialized data bases where the on-line subscriber requires a up-to-date information which is a subset of the total data base contained on the server.

15 Although the invention has been described, in general, in the "Summary Of The Invention" section, it should be noted that the invention includes any of the components, functions, and/or steps described, claimed, and/or shown herein when used in any combination or subcombination. Accordingly, there are any number of alternate combinations for defining the invention which combine one or more elements from the existing claims and/or from the
20 specification in various combinations or subcombinations.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 shows a partial flow and partial block diagram of aspects of the present invention;

Fig. 2 shows a flow diagram of an example of the data extraction analysis (filtering)
5 in accordance with aspects of the present invention;

Fig. 3 shows a block diagram of local terminal device in accordance with aspects of the present invention; and

Fig. 4 shows a block diagram of a physical arrangement of aspects of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

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Referring to Fig. 1, a broadcast data retrieval system 1 may include a server 21 which outputs a stream of, for example, all of the data available on a network (e.g., the Internet or a particular Intranet) and/or another database of information in a continuous manner for transmission via a broadcast system 2. The broadcast system 2 may be variously configured to include any suitable broadcast medium, but most preferably includes one or more earth
stations 22 and at least one communication satellite 23. Of course, those skilled in the art will appreciate that other broadcast techniques (e.g., free space transmission, satellite transmission, and/or cable transmission) are also suitable to practice aspects of the present invention.

20

In preferred embodiments, the data broadcast by broadcast system 2 is demodulated by demodulator 3 to convert the data from the broadcast system, e.g., radio frequency waves, into

digital data suitable for processing by a local processing device 24, e.g., a TV and/or a PC 24. Viewed functionally, the data from demodulator 3 is first input into a data filter 4. Data filter 4 analyzes the broadcast data stream received from demodulator 3 and filters out undesirable data based on a viewer's profile 8. The desired information is then saved in local storage 5, e.g., a conventional optical or magnetic disk. The user profile information is preselected by a viewer. Alternatively, and less preferably, the user profile information for a particular local processing device may be supplied by an information provider using any suitable method. After the data review process has begun, the viewer may browse the locally stored data in server 5 via local browser 6, viewer control 9 and display 7. Thus, the local processing device 24 preferably stores a subset of the information broadcast from server 21, which may thereafter be viewed by a viewer.

Fig. 3 shows the main components of the apparatus when it is used as a local browser of information. In Fig. 3, the local processing device 24 may include a local storage 5, a demodulator 3, central processor 12, display 7, and viewer control 9. A viewer inputs data requests through the viewer control 9, e.g., a remote control, a mouse and/or a keyboard. The central processor (e.g., a central processor of a PC and/or a TV) interprets the viewer controls to search the local disk 5 for information pertaining to the desires of the viewer. The resulting data in the form of text, graphics, images, and/or video are made available to the user via suitable output mechanism such as display monitor 7.

Fig. 4 shows a block diagram of the components of an exemplary broadcast data retrieval system 1 arranged in block diagram form. The components similar to the components

of Fig. 1 have the same reference numerals and have already been described above. In the embodiment shown in Fig. 4, it should be noted that the demodulator 3 may be part of or separate from the local processing device 24. For example, the local processing device 24 may be variously configured to include demodulator 3, local storage 5, display 7, user interface 9, CPU 26 and/or memory 27. Additionally, each of the components of the local processing device 24 may be coupled together in any suitable configuration such as by using one or more system buses 28. Further, server 21 preferably includes a modulator for modulating digital data transmitted via broadcast system 2. One or more software programs for implementing the digital filtering, user interface, and browsing functions are preferably stored in the local storage 5.

In operation, the application software is loaded in memory 27 for operation with CPU 26 and demodulator 3. In the most preferred embodiments, the filtering software operates continuously on the digital data received by demodulator 3. Alternatively, the local processing device 24 interrupts the monitoring of digital data when accessed by a user in order to better allocate local processing resources to the user's application programs such as the browser. When accessed by a user, the browsing software and/or software for capturing a viewer preferences is also preferably loaded from local storage 5 into memory 27 and processed by CPU 26.

Fig. 2 shows a functional flow diagram of one example of aspects of the present invention. For example, an incoming digital data stream 10 received via demodulator 3 contains a large amount of information. Local extraction 11 via data filter 4 in conjunction

with the viewer's profile 8 operates to extract data from the digital data stream. In the exemplary embodiment illustrated in Fig. 2, local data filter 11 selects data representative of homes in the price range of 100 to 130 thousand dollars. The selected data is thereafter stored in local storage 5 for later review. Data which does not match the requirements specified by the viewer's profile may be discarded (i.e., simply not retained in local storage 5). The result is that an extensive data stream 10 can be significantly and intelligently reduced and captured for local review and interaction.

Other examples include updating specialized data bases which are now only updated on a quarterly basis via one or more CD ROMs. For example, numerous database service providers distribute quarterly updates of certain database by sending out new CD ROMs to their subscribers. The present system could be utilized to provide monthly, daily, or even hourly updates via broadcast system 2.

Still other examples may include a national used car network in digital form. For example, a data base of used cars including photos, pricing, make, model, and year, could be implemented about all of the vehicles presently available nationwide. One local viewer may not have a present interest in a car, therefore, none of the car data would be captured. Another local viewer might be looking for a late model Chevrolet, and only late model Chevrolets would be captured to the viewer's local disk for later viewing. Yet another viewer might be looking for any car costing less than \$1,000, and all matches would be captured off the broadcast data for the viewer to look at conveniently. Networks for automobiles, real estate, rental properties, job, or classified advertisements of any type could be established.

In this manner, broadcast distribution of digital data and images can be accomplished with selective capture and interaction with the digital data and images without the need for bidirectional communications. The apparatus receives a continuous transmission of data (e.g., unidirectional data) broadcast through common unidirectional methods typically associated with television (e.g., free space transmission, satellite transmission, cable transmission). The information is collected based on criteria established by the viewer, and is then stored for later interactive review by the viewer. Embodiments of the invention can be used in a system where massive amounts of interactive data are to be distributed using a communications network infrastructure where bidirectional communications are not feasible. The collection of the information is done in a manner as to capture only the portion of information that is of interest to the viewer, based on his/her interests. In this manner, a data network with interactive images can provide comprehensive, interactive images for real estate, apartment, automobile, and employment listings, and sundry of speciality catalogues such as clothing, sporting goods, plants etc.

While exemplary broadcast data retrieval systems embodying the present invention are shown, it will be understood, of course, that the invention is not limited to these embodiments. Modifications may be made by those skilled in the art, particularly in light of the foregoing teachings. It is, therefore, intended that the appended claims cover any such modifications which incorporate the features of this invention or encompass the true spirit and scope of the invention.

WHAT IS CLAIMED IS:

1. A broadcast retrieval system including:
 - a server including data;
 - a unidirectional broadcast system means for broadcasting the data as a digital
 - 5 data stream;
 - demodulator means for demodulating the digital data stream;
 - means for capturing a viewer interest profile;
 - local processor means for selectively capturing a subset of the data in the digital
 - data stream using a filtering means for retaining data based on the viewer interest profile;
 - 10 means for storing the subset of the data in a local storage; and
 - means for browsing and viewing a portion of the subset of the data stored in the
 - local storage based on input from a viewer.
2. The broadcast retrieval system of claim 1 wherein the local processor does not include a return path to the server.
- 15 3. The broadcast retrieval system of claim 1 wherein the digital data includes text and graphics.

4. The broadcast retrieval system of claim 1 wherein the digital data includes video.

5. The broadcast retrieval system of claim 1 wherein the digital data includes hypertext links.

5 6. An apparatus including:
a demodulator for receiving a unidirectional digital data stream;
a user interface for inputting data from a user;
a local storage device for storing data and a viewer interest profile;
a display for displaying data; and
10 a central processor coupled to the demodulator, the user interface, the local storage device, and the display for selectively storing in the local storage device a subset of the unidirectional digital data stream responsive to the viewer interest profile and for browsing the subset of the data stored in the local storage responsive signals from the user interface.

15 7. The apparatus of claim 6 wherein the unidirectional digital data stream includes text and graphics.

8. The apparatus of claim 7 wherein the unidirectional digital data stream includes video.

9. The apparatus of claim 7 wherein the unidirectional digital data stream includes
hypertext links.

10. An article of manufacture including a disk storing software, the software including
a program for selectively storing a subset of a unidirectional digital data stream responsive to
5 a viewer interest profile and for selectively browsing the subset of the unidirectional digital
data stream.

11. A method comprising:
broadcasting a unidirectional digital data stream;
demodulating the unidirectional digital data stream;
10 inputting a viewer interest profile;
selectively storing in a local storage device a subset of the data in the unidirectional
digital data stream responsive to the viewer interest profile; and
thereafter, browsing the subset of the data in the local storage responsive to commands
received from a user.

12. The method of claim 11 wherein browsing the data includes browsing hypertext
15 data.

FIG. 1

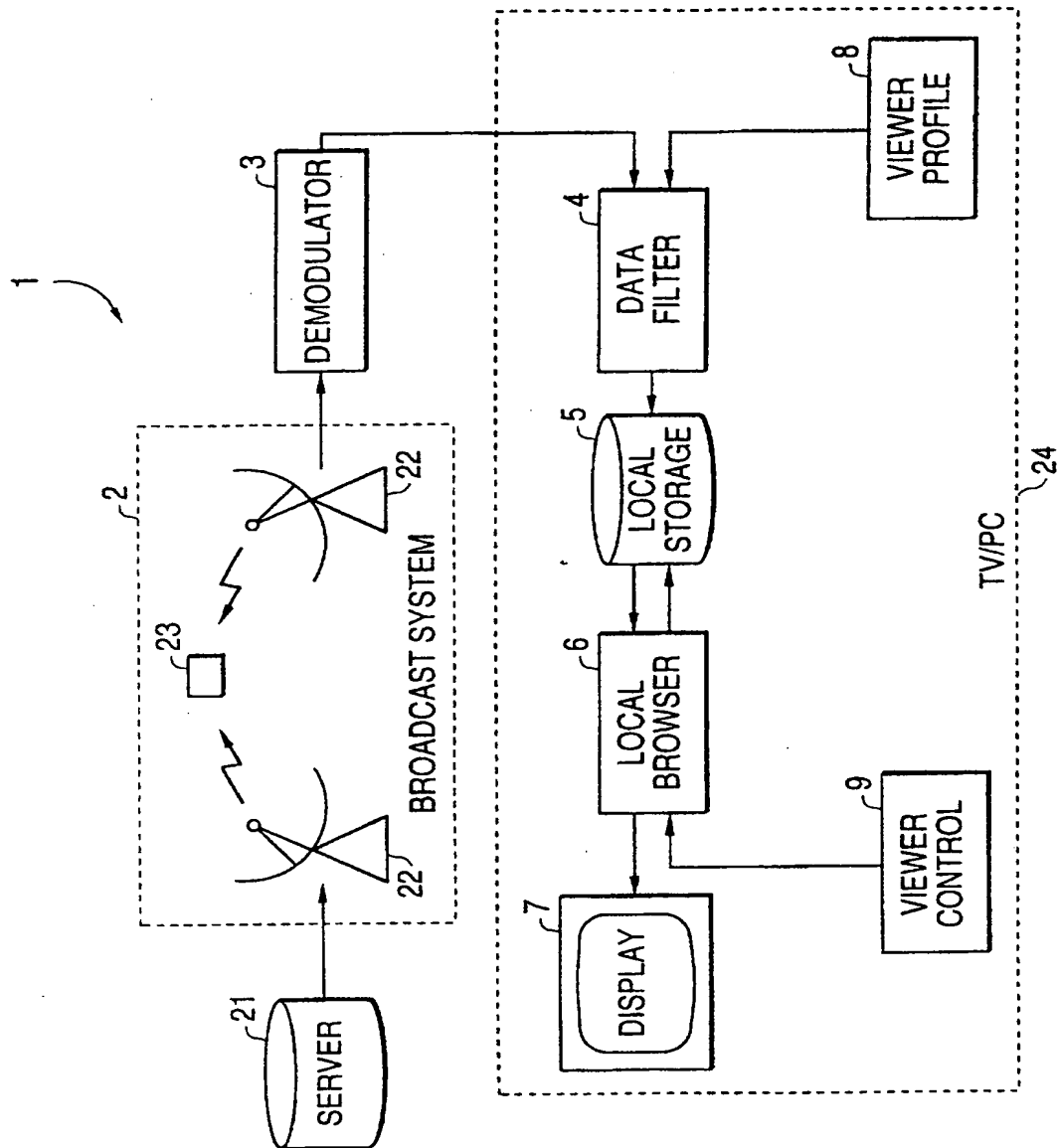


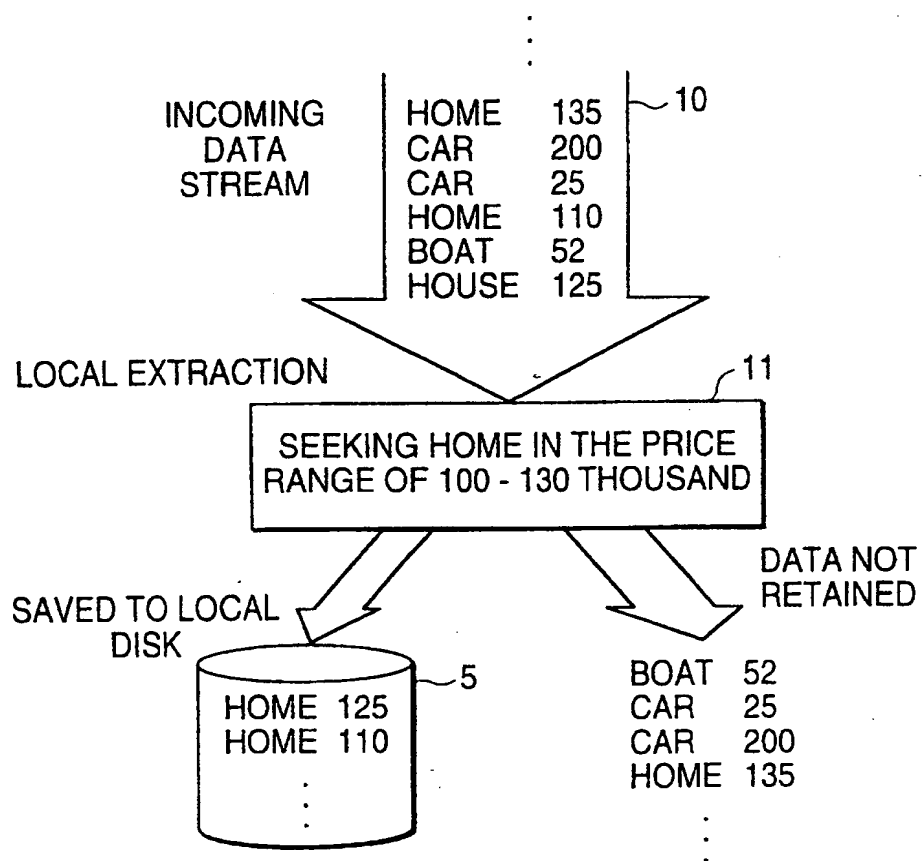
FIG. 2

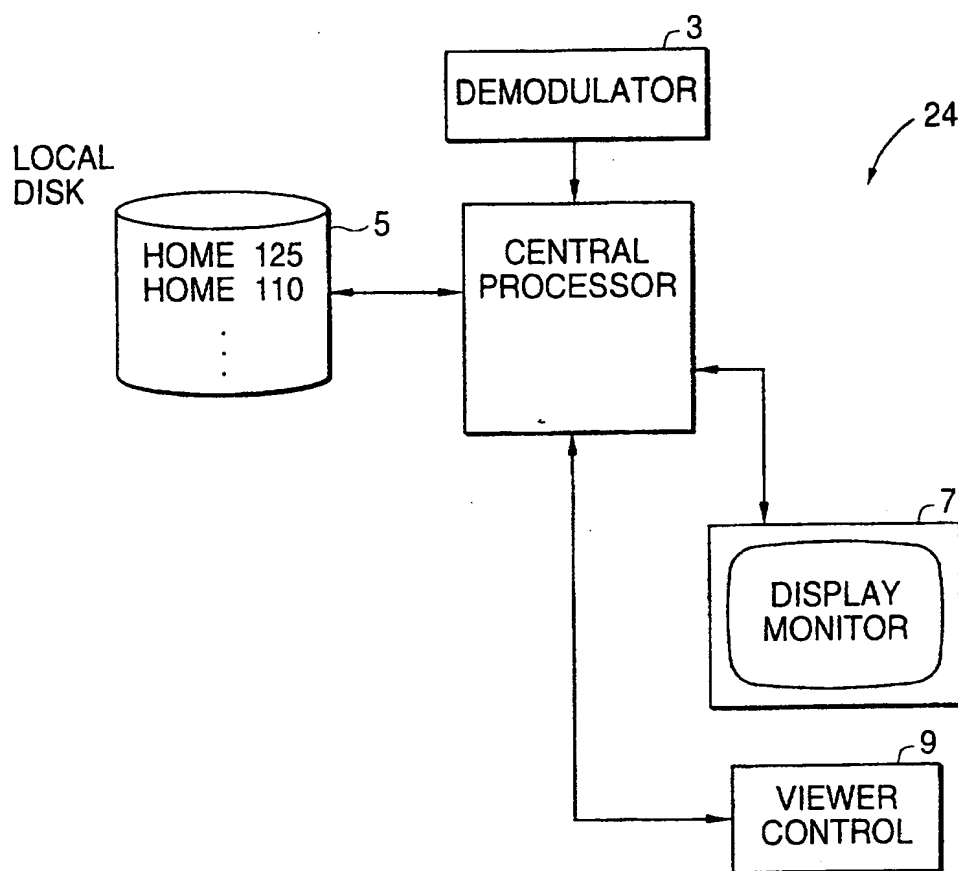
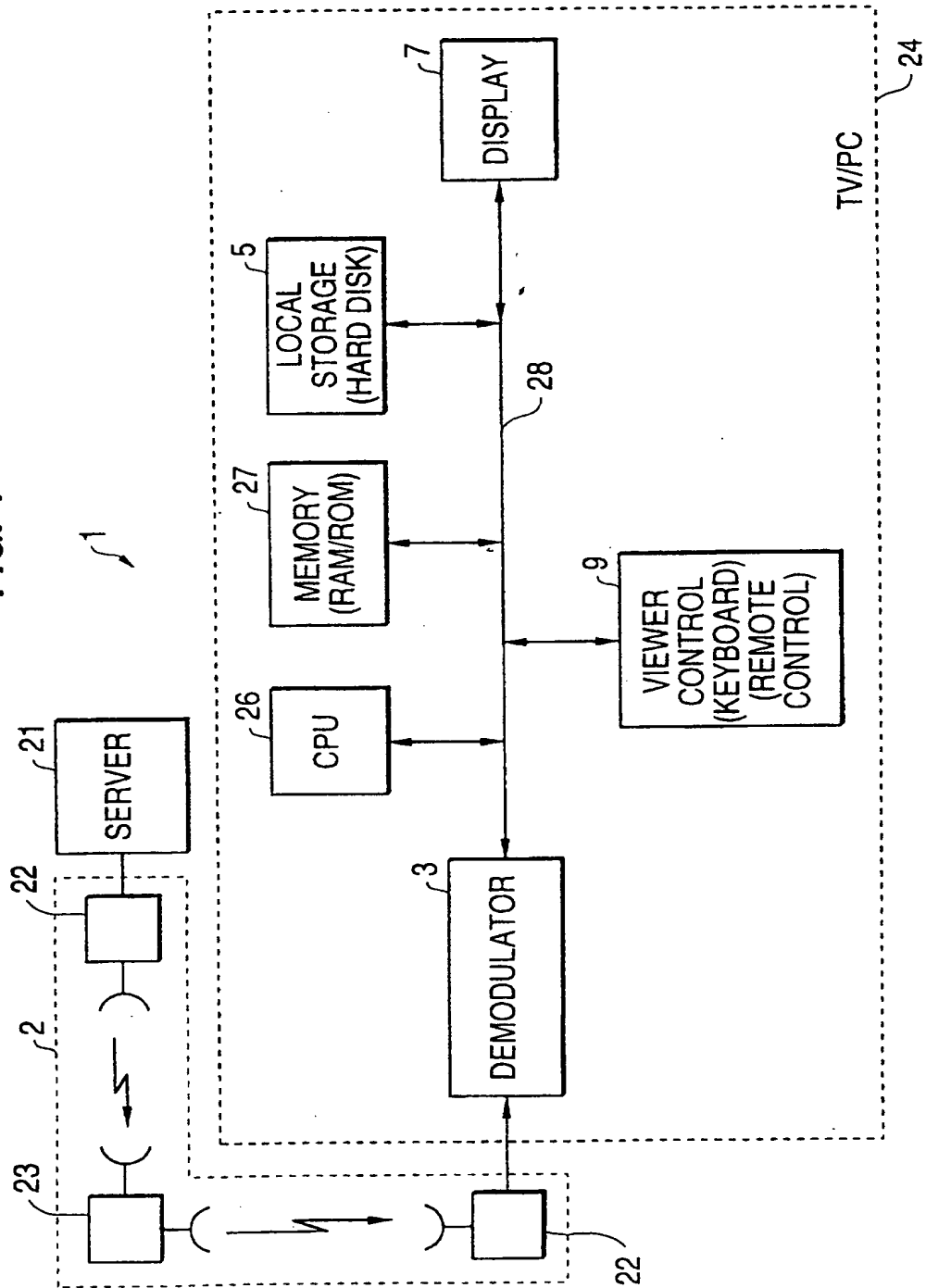
FIG. 3

FIG. 4



INTERNATIONAL SEARCH REPORT

International application No.

PCT/US97/12001

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) : H04N 7/16

US CL : 348/1; 455/2

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 348/1, 2, 3, 6, 7, 10, 12, 13; 455/2, 4.2, 5.1, 6.1, 6.2, 6.3

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,469,206 A (STRUBBE ET AL.) 21 November 1995, see entire document	6-12
Y		1-5
Y	US 5,446,490 A (BLAHUT ET AL.) 29 August 1995, see figure 1, col. 3, line 21 - col. 4, line 10	1-5
X	US 5,465,113 A (GILBOY) 07 November 1995, see entire document	6-12
X	US 5,481,296 A (CRAGUN ET AL.) 02 January 1996, see entire document	6-12
X	US 5,410,344 A (GRAVES ET AL.) 25 April 1995, see entire document	6-12

☒ Further documents are listed in the continuation of Box C.
 ☐ See patent family annex.

* Special categories of cited documents:	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
A document defining the general state of the art which is not considered to be of particular relevance	*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
B earlier document published on or after the international filing date	*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	*A* document member of the same patent family
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P document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

27 SEPTEMBER 1997

Date of mailing of the international search report

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INTERNATIONAL SEARCH REPORT**International application No.**
PCT/US97/12001**C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,038,211 A (HALLENBECK) 06 August 1991, see entire document	6-12

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